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BOLLWORM

a, Eggs; *b*, egg (15 times natural size); *c*, young larva on square; *d*, damaged square; *e*, full-grown larvae showing color differences; *f*, pupa in soil; g, adult. Eggs about 15 times natural size; other stages, about natural size.

(See other side for life history and control)

Picture Sheet No. 16

Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, United States Department of Agriculture

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BOLLWORM

(*Heliothis armigera* (Hbn.))

Life History

The bollworm damages cotton in all parts of the United States, but the losses are usually greatest in Texas, Oklahoma, and Louisiana. It also feeds on many plants besides cotton, especially corn and tomato, and is known as the corn earworm and the tomato fruitworm. Cotton is not the preferred food plant, and bollworm infestations usually develop rather late in the season, about the time corn silks are drying out and after dusting for boll weevil control is over.

The bollworm moths prefer rapidly growing, succulent cotton for laying their eggs. The eggs are laid singly on the tender growth and newly formed squares. They are smaller than the head of an ordinary pin, and pearly white when first laid, but change to a dark color before hatching. The small larvae, or "worms," feed for a few days on the tender buds or leaves and on the outside of squares before burrowing into squares or bolls, usually near the base. Large worms feed almost entirely *inside* the bolls, and it is very difficult, if not impossible, to control them. Full-grown larvae enter the soil and change to the pupal, or resting, stage. There are several broods a year, the last of which passes the winter in the underground pupal cells. Each bollworm destroys a large number of squares and bolls, and when bollworms are numerous a crop of cotton can be ruined in a very short time. Damage often occurs so late in the season that the plants do not have time to mature another crop of bolls.

Control

When it is about time for bollworms to appear, the tops of the plants should be examined frequently for eggs and small worms. When 20 to 25 eggs that are beginning to hatch, or this number of eggs and very small worms, are found per 100 plants, it is time to begin dusting. *Successful bollworm control depends on heavy applications of dust while eggs are hatching and before the worms enter the bolls.*

Dust at 5-day intervals with 10 to 15 pounds per acre of a mixture containing 10 percent of DDT in sulfur, pyrophyllite, or talc, or with calcium arsenate, lead arsenate, or cryolite. Use more pounds per acre when the infestations are heavy and the plants large. Two or three applications will usually control a brood of bollworms, but there may be more than one brood or a steady movement of egg-laying moths to cotton from other crops, with no distinct broods. In such cases several additional applications may be needed to keep the plants covered with insecticides to kill the newly hatched worms. Arrange the dust nozzles so that there will be one over each row and a few inches above the cotton, so that the tops of the plants will be well covered with dust. Ladybird beetles and other natural enemies, or extremely hot, dry, and windy weather, often destroy enough eggs and young bollworms to control a threatening infestation without the use of insecticides. Nicotine may be added to the insecticides to prevent aphids from becoming injurious.

Caution: The DDT, arsenical, and cryolite insecticides are poisonous and should be handled with care.

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